

What we claim is:

1. A semiconductor apparatus having a charge pump circuit which includes MOSFETs and MOS capacitors formed on the same substrate, wherein at least one of said MOS capacitors comprises:

a multiplicity of first electrodes formed at multiple locations within one region of said substrate;

insulating layers formed on/above respective substrate regions between neighboring first electrodes, each layer covering at least the respective substrate region; and

a multiplicity of second electrodes formed on/above said respective insulating layers.

2. The semiconductor apparatus according to claim 1, wherein said one region is a semiconductor region having a specific conduction type isolated from other regions by isolation regions.

3. The semiconductor apparatus according to claim 2, wherein said first electrodes have a high conductivity, said electrodes formed by increasing the conductivity of said one region.

4. The semiconductor apparatus according to claim 1, wherein said insulating layer is an insulating oxide layer.

5. The semiconductor apparatus according to claim 1, wherein each of said first electrodes has an elongate rectangular shape extending in parallel with other first electrodes; and

each of said second electrodes has an elongate rectangular shape extending between two neighboring first electrodes.

6. The semiconductor apparatus according to claim 1, wherein  
said MOS capacitor is used as the first charge pump capacitor in the first stage of said charge pump circuit; and  
at least the MOS capacitor in the last stage of said charge pump circuit is different in structure from said first stage MOS capacitor.